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his great services in the cause of science. Learned Academies abroad placed his name upon their distinguished rolls, and Universities at home crowned him with their highest honors. He was elected a Foreign Honorary Member of this Academy, May 28, 1867. His life was protracted for a few years after his physical strength was exhausted and his mind had been overshadowed by disastrous eclipse.

JOHANN FRIEDRICH JULIUS SCHMIDT.

Johann Friedrich Julius Schmidt was born at Eutin, in the Grand Duchy of Oldenburg, October 25, 1825, and was educated at the Hamburg Gymnasium. He developed very early in life a taste for the observation of natural phenomena, which was directed into astronomical channels, at the age of fourteen years, by his coming into possession of a copy of Schröter's work on the Moon, which so struck his attention that he at once began his first attempts at astronomical observation by sketching the lunar surface with a small telescope constructed by his father, which he steadied against a lamp-post. This work soon became his chief occupation ; but was carried on with improved facilities, first by a telescope lent him by a gentleman interested in the progress of the young astronomer, and afterwards by the use of the instruments at the Altona and Hamburg observatories, to which latter place he went as an assistant to Rümker in 1842. In 1845 Schmidt went to Bilk, near Dusseldorf, where Benzenberg had established an observatory for the observation of meteors and the search for intra-Mercurial planets. His instrumental facilities here, however, were much restricted, the solicitude of Benzenberg lest the polish and lacquer of the principal telescope should suffer by handling practically prohibiting its use. Benzenberg died in 1846, and Schmidt went to Bonn as assistant to Argelander. Here his lunar work was somewhat interrupted, his time being largely occupied with observations of planets and comets, and with the meridian circle. He made, on the occasion of the total eclipse of the sun, July 28, 1851, important observations, in East Prussia, with reference to the phenomena which are now identified with the chromosphere, revealed more distinctly since that time by the spectroscope.

Later, Schmidt was appointed, on Argelander's recommendation, to the charge of a private observatory established at Olmütz by Baron von Unkrechtberg, provided with a small meridian circle and a five-inch refractor, with smaller telescopes and subsidiary apparatus. He began work here in June, 1853, and actively prosecuted work in the various directions in which he was interested until August, 1858, when, after a few months' sojourn at Vienna, where he observed in September and October Donati's comet, and in Trieste, he went to Athens, December 15, 1858, where he had been appointed Director of the Observatory. Here, as soon as the condition of the institution permitted, he began the voluminous series of observations, the results of which, published annually in the Astronomische Nachrichten, have become so familiar to astronomers, and afford such striking testimony to his industry and zeal.

Schmidt seems never to have been attracted to work in the mathematical or calculative fields of astronomy; one or two preliminary orbits of the comets of 1847 and 1848, and of the planet Egeria, being his only published work in this direction. From the start his inclination was strongly toward the observation of the physical phenomena of the heavenly bodies, and to this his favorite work he applied himself with an ardor and unwavering persistence which may be considered among the chief attributes of genius. His enormous industry is remarkable even in this industrious scientific age. The duration of his scientific life was forty-three years, and in this period, with only very moderate instrumental means, and scarcely any assistance, he has accumulated a mass of observation material which seems incomprehensible to a man of ordinary powers. His work on the moon alone, covering thirty-three years, would have appalled most men. Any one who will attempt to delineate even a very small portion of the lunar surface with an instrument of the size used by Schmidt, and with the amount of detail given by him, will appreciate the task achieved in his chart of the Lunar Mountains, published in 1878. The drawings and micrometrical measures of various portions of the moon, he accumulated for about a quarter of a century before he seriously contemplated forming a general chart. In 1865, he first resolved to lay down all his fragmentary surveys on a six-foot map, to see what parts had been neglected. In so doing he found how much was wanting, and how little he possessed; but, nothing daunted, devoted nine years more to the extension and repetition of his observations, and so industriously that his older work became of comparatively little importance. He then determined to conclude the labor and publish what he had already accomplished, as it was manifest that the filling in of all the detail visible in a six-foot refractor would surpass the powers of endurance, and require more than the lifetime, of a single individual. In 1874 he carried his chart to Berlin, and it excited so much interest that the German government undertook its publication. In point of comprehensiveness it far exceeds any other attempt of its kind. Thus, while Lohrmann's map includes about 7,200 craters, and Mädler's 7,800, Schmidt's chart includes the extraordinary number of nearly 33,000.

Next or perhaps equal in importance is Schmidt's series of observations on the variable stars, which extend from 1842 to 1883, and which probably outnumber those of all other observers of his time combined. It has been his practice to publish annually, in the Astronomische Nachrichten, the provisional results, and it seems peculiarly fitting that the same number of that journal which contains the announcement of his death contains also the last of this memorable series. Schmidt made several notable discoveries of new variables. The original records of his observations have been deposited in the Astro-Physical Observatory at Potsdam, and will form an almost inexhaustible treasure to future workers in this field.

In still another department, that of the solar phenomena, Schmidt was a remarkably fruitful and persevering observer. In 1857 he published the results of a continuous eleven-year series of observations on the sun-spots, which are simultaneous with, and serve to complete and supplement, those of Schwabe. He gives tables of the daily number of spots and groups, with remarks on special phenomena, and adds a discussion of them. His speculations on the possible connection of the sun-spot period with the varying position of the centre of gravity of the solar system with reference to the centre of the sun itself, have not met with general acceptance. During the last twenty years, also, this kind of observation has been perseveringly kept up by Schmidt, with the help in recent years of his assistant, Alexander Wurlisch.

The other labors of Schmidt, although important and in extent sufficient to absorb the whole time and energy of an ordinary man, can only be mentioned briefly here. He was a persistent observer from 1843 to 1879 of the phenomena pertaining to the Zodiacal Light; made very large contributions to the fund of observations of shooting-stars during the same period; published a thirteen years' series of observations on the Northern Light; determined micrometrically the positions of about three hundred nebulæ; made very elaborate drawings of the Great Nebula in Orion, and a chart of the surrounding region; has deposited at Vienna a beautiful drawing of the Milky Way; accumulated during forty years voluminous observations on the brightness of the principal planets, besides nearly six hundred drawings of the surface of Mars and Jupiter; made important investigations on the subject of the twilight, based on his observations at Hamburg, Rome, Naples, and in Greece, from 1843 to 1864, obtaining very interesting results; published, as Annals of the Athens Observatory, important contributions to our knowledge of the physical phenomena of comets, and also on the Physical Geography of Greece; co-operated largely in the construction of Hour V. of the Berlin Academy Charts, the most elaborately worked of the series; made series of measures of the diameters of the various planets, as well as observations on Saturn's rings; and finally took a very large share in the work of position determinations of comets and asteroids.

Surely this devoted servant of science has well earned the tribute of admiration which astronomers universally pay to his memory. To make good his loss, not one, but several assiduous workers will be required in the various fields which he has so long and ardently cultivated.

Schmidt died of heart disease, being found dead in his bed, Thursday morning, February 7, 1884, after having passed the previous evening apparently in perfect health at the German Embassy at Athens. The funeral was made an occasion for national mourning, in which all classes sorrowfully participated.

GABRIEL GUSTAV VALENTIN.

Gabriel Gustav Valentin, for forty-five years Professor of Physiology at Berne, died in that city on the 23d of May, 1883. He was born of Jewish parents, at Breslau, on the 8th of July, 1810. He took his degree in medicine in his native city in 1832, and continued to practise his profession there till 1836, when he was called to the chair of Physiology at Berne. This position he held till 1881, when he resigned on account of ill health.

During his long period of scientific activity Professor Valentin made contributions to nearly every department of Physiology. We find him, for instance, in 1842, contributing to Wagner's Lexicon of Physiology articles on Secretion, Animal Electricity, Nutrition, Biliary Movement, and on Galvanism in its effects on the animal body and the tissues of the human and animal body. His associates in this important scientific undertaking were the brothers Weber, Purkinje, Lehmann, Ludwig, Von Siebold, Berzelius, Bischoff, Bidder, Frerichs, Leuckart, Volkmann, and many others of that band of devoted investigators whose labors during the middle of the present century contributed so